Operating Instructions

Ex Plug Connector miniClix

> 8591/1
> 8591/4

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2 General Information

2.1 Manufacturer

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2.2 Information regarding the Operating Instructions

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We reserve the right to make technical changes without notice.

2.3 Symbols Used

▶	Action prompt: Describes actions to be carried out by the user.
▷	Reaction symbol: Describes the results or the reactions to the actions taken.
✗	Bullet
☞	Information symbol: Describes the notes and recommendations.
	Warning sign: Danger from energised parts!
	Warning sign: Danger due to an explosive atmosphere!

3 General Safety Information

3.1 Safety Instructions for Assembly and Operating Personnel

The operating instructions contain basic safety instructions which are to be observed during installation, operation and maintenance. Non-observance can lead to endangerment of persons, plant and the environment.

⚠WARNING
Risk due to unauthorised work being performed on the device! ▷ Risk of injury and damage to equipment. ▶ Assembly, installation, commissioning, operation and maintenance must only be performed by personnel who are both authorised and suitably trained for this purpose.

⚠WARNING	
	**Danger due to dust deposits!** ▷ Risk of injury and damage to equipment. ▷ Explosion protection is not guaranteed any longer. ▶ According to IEC/EN 61241-1, a device must not be operated with a dust layer exceeding 50 mm.

Before assembly/commissioning:

- ▶ Read through the operating instructions.
- ▶ Give adequate training to the assembly and operating personnel.
- ▶ Ensure that the contents of the operating instructions are fully understood by the personnel in charge.
- ▶ The national installation and assembly regulations (e.g. IEC/EN 60079-14) apply.

When operating the device:

- ▶ The device may only be plugged in or out when subjected to a load of less than 250 V AC and 10 A rated current.
- ▶ Ensure the operating instructions are made available on location at all times.
- ▶ Observe safety instructions.
- ▶ Observe national safety and accident prevention regulations.
- ▶ Servicing/maintenance work or repairs which are not described in the operating instructions must not be performed without prior agreement with the manufacturer.
- ▶ Any damage may render explosion protection null and void.
- ▶ Alterations and modifications of the device are generally not permitted.
- ▶ Install and use the device only if it is undamaged, dry and clean.
- ▶ The device may only be used with the corresponding undamaged plugs and couplers.
- ▶ The plug connectors may also be used for intrinsically safe circuits in accordance with Ex ia/ib IIC T6. Apply the corresponding marking if used for intrinsically safe circuits.
- ▶ Intrinsically safe and non-intrinsically safe circuits may not be used together in a common plug connector.
- ▶ Ensure that the plug/device plug is voltage free when the plug connection is disconnected. On bus systems powered at both ends (e.g. Profibus DP or Ethernet), the station connected to the plug/device plug must be disconnected from the supply before the plug connector is removed. Install the plug/devic plug on the device for bus systems with integrated power supply of the device (e.g. Profibus PA or Foundation Fieldbus H1).

- ▶ Energised couplers/flange sockets must be closed off by means of protective caps immediately after disconnection. Make sure that the caps close properly as otherwise the minimum ingress protection and the explosion protection are no longer guaranteed.
- ▶ Unused components should be stored with protective caps.

If you have questions:

- ▶ Contact the manufacturer.

3.2 Warnings

Warnings are sub-divided in these operating instructions according to the following scheme:

⚠ WARNING
Type and source of the danger! ▷ Possible consequences. ▶ Measures to avoid danger.

They are always identified by the signal word “WARNING“ and sometimes also have a symbol which is specific to the danger involved.

3.3 Special conditions

⚠ WARNING	
	**Danger from energised parts!** ▷ Risk of severe injuries. ▶ All connections and wiring must be disconnected from the power supply. ▶ Secure the connections against unauthorised activation.

Temperature class and type of protection

- ▶ Adhere to the temperature class and type of protection as specified on the rating plate.

Requirements to be met by the connecting cable:

- ▶ Lay the connecting cable of the plug connector securely.
- ▶ Make sure that the cable is protected against mechanical damage.
- ▶ Select a connecting cable that meets the thermal and mechanical requirements in the application area.

For connection in areas subject to explosion hazard.

- ▶ Use a terminal compartment that meets the requirements of a recognized type of protection in accordance with IEC/EN 60079-0.

Metal versions of flange socket, device plug and angled adaptor:

- ▶ Installation permitted in walls of enclosures designed with type of protection Flameproof Enclosure "d" and Increased Safety "e".

Plastic versions of flange socket, device plug and angled adaptor:

- ▶ Installation permitted in walls of enclosures designed with type of protection Increased Safety "e".
- ▶ Plastic versions of the plug connector must be mechanically protected at temperatures below -20°C.
- ▶ Do not use angled adaptors made of plastic with temperatures below -20°C.

If using terminal compartments of type of protection Increased Safety "e" according to IEC/EN 60079-7:

- ▶ Observe the clearance and creepage distances.

Equipotential bonding

- ▶ Ensure equipotential bonding or earthing by attaching metal versions of the flange sokket, device plug and/or angled adaptor to the entire plant.

3.4 Conformity to Standards

The plug connectors have been developed, manufactured and tested according to the state-of-art and EN 29001 (ISO 9001).

Among others, they comply with the following regulations and standards:

- ✗ 94/9/EG
- ✗ IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7, IEC/EN 60079-11, IEC/EN 60079-14
- ✗ IEC/EN 61241-0, IEC/EN 61241-1

4 Designated Use

Series 8591/1 and 8591/4 plug connectors are suitable for use in areas subject to explosion hazards of Zones 1, 2, 21 and 22 in accordance with IEC/EN standards as well as for applications in the industrial sector.

Ambient conditions

High-quality materials are used for enclosures, including external metal parts, which guarantee protection against corrosion and resistance against chemical substances for applications in industrial environments.

- ✗ Impact-resistant polyamide
- ✗ Nickel-plated brass
- ✗ Stainless steel AISI 316L

Usage

Application examples for Series 8591 plug connectors include:

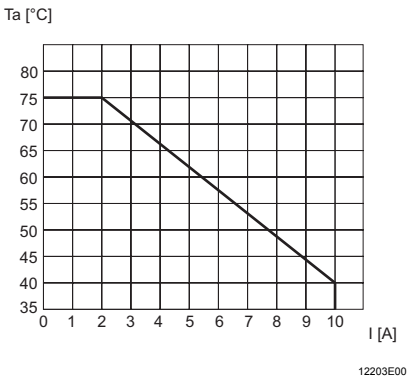
- ✗ Bus connections
- ✗ Signal and data wiring
- ✗ Power supply of movable local controls
- ✗ Power supply of electrical systems as well as movable machines and drives

in areas subject to explosion hazard.

They are used as quick-action connectors of explosion-protected electrical apparatus in intrinsically safe (Ex) and industrial areas.

5 Technical Data

Explosion protection		
Gas explosion protection		
ATEX	⟨Ex⟩ II 2 G Ex de IIC T6	
IECEx	Ex de IIC T6 or Ex ia/ib IIC T6	
Dust explosion protection		
ATEX	⟨Ex⟩ II 2 D IP66 T52 °C	
IECEx	Ex tD A21 IP66 T52 °C	
Ambient temperature	-25 °C...+40 °C (Plastic version) -55 °C...+40 °C (Plastic version, protected against impacts) -55 °C...+40 °C (Metal version) -55 °C...+75 °C (Metal version, I_{th} max. 2 A) -55 °C...+75 °C (Metal version, protected against impacts, I_{th} max. 2 A) With limited rated current:	
Certificates		
Gas explosion protection		
ATEX	PTB 03 ATEX 1097 X	
IECEx	IECEx BKI 07.0001X	
Dust explosion protection		
ATEX	PTB 03 ATEX 1097 X	
IECEx	IECEx BKI 07.0001X	
Rated values		
AC voltage	250 V	
AC current	10 A	
Frequency	50 / 60 Hz	
cos φ	0.9	
DC voltage	60 V	
DC current	2.5 A	
L/R	10 ms	
Switching capacity	IEC/EN 60947-4	IEC/EN 61984
	AC 3: 250 V / 1 A DC 3: 60 V / 0.5 A	AC: 250 V / 10 A DC: 60 V / 2.5 A
Back-up fuse		
without thermal protection	10 A	
with thermal protection	20 A gL	
Transmission rate	up to 100 MBit/s (acc. to TIA/EIA-568-B.2 Category 5e)	
Frequency range	0 MHz ... 100 MHz (Fast Ethernet compatible)	
Enclosure material	Nickel-plated brass; polyamide; stainless steel AISI 316L	



Connectors

Coupler / plug

Crimp 1.5 mm²*)	0.75 mm² ... 1.5 mm²
Crimp 2.5 mm²*)	1.5 mm² ... 2.5 mm²
Spring-type terminal	0.5 mm² ... 1 mm² (flexible) 0.5 mm² ... 1.5 mm² (rigid)

Flange socket / device plug

Crimp 1.5 mm²*)	0.75 mm² ... 1.5 mm²
Crimp 2.5 mm²*)	1.5 mm² ... 2.5 mm²
with leads (30 cm; only for metal version)	1.5 mm²; 2.5 mm²

Metal flange socket / device plug

Version for armoured cables

External insulation	∅ 12 mm ... 21 mm
Internal insulation	∅ 8.5 mm ... 16 mm
Armouring	up to 1.5 mm

PE-bracket connection

Crimp 1.5 mm²*)	0.75 mm² ... 1.5 mm²
Crimp 2.5 mm²*)	1.5 mm² ... 2.5 mm²

*) only with special crimping tool, see accessories;
alternative: soldering 0.34 mm² ... 1 mm² (with heat-shrink tubing)

Cable entries

8591/...-..-...1	∅ 4 mm ... 7.5 mm
8591/...-..-...2	∅ 7.5 mm ... 11 mm

Assembly

Simply screw the flange socket / device plug into existing openings and wire

- Plastic version:	M 20 x 1.5 thread
- Metal version:	M 20 x 1.5 or $^1/_2$″ NPT thread

Ingress Protection

IP66 / IP68 (2 m water column, 1 hour)
acc. to IEC/EN 60529
(with protective caps closed and secured as well as properly fitted and secured components)

Protection class

I - fulfilled by metal versions
II - fulfilled by plastic versions
acc. to IEC/EN 60598

Storage temperature

- 55 °C ... + 80 °C (in original packaging)

Test torque

	Plastic	Metal (Ex e)	Metall (Ex d)
Screw-in thread (M 20 x 1.5)			
Angled adaptor	2.5 Nm	2.5 Nm	3.5 Nm
Flange socket	2.5 Nm	2.5 Nm	3.5 Nm
Device plug	2.5 Nm	2.5 Nm	3.5 Nm
Union nut	2.5 Nm	2.5 Nm	2.5 Nm
Protective cap	2.5 Nm	2.5 Nm	2.5 Nm
Pressure screw with strain relief	2.5 Nm	3.5 Nm	- -
Lock screws	1.0 Nm	- -	- -

Weight

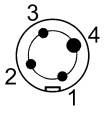
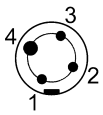
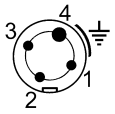
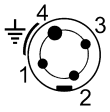
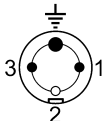
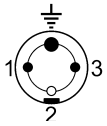
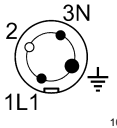
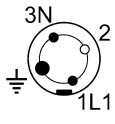
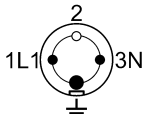
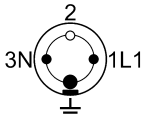
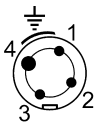
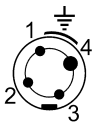
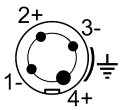
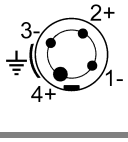
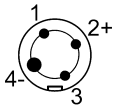
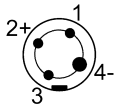
		Plastic	Metal	Metal - armoured version
Coupler [1]	8591/.3.-..-....	approx. 54 g	approx. 118 g	approx. 215 g
Plug	8591/.7.-..-....	approx. 53 g	approx. 148 g	approx. 250 g
Flange sokket [1]	8591/.8.-..-....	approx. 37 g	approx. 128 g	- -
Device plug [1]	8591/.9.-..-....	approx. 41 g	approx. 141 g	- -
Angled adaptor	8591/11.-..-....	approx. 26 g	approx. 164 g	- -
Protective caps:				
for plug / device plug		approx. 10 g	approx. 44 g	
for coupler / flange socket		approx. 13 g	approx. 80 g	

[1] Weight including plastic protective cap

☞ Additional technical data for layout and designs: see the data sheet

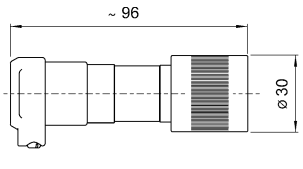
Recommended coding of the plug connector

Turn guide nose/guide notch downwards (6 h)
All other codings are based on this position

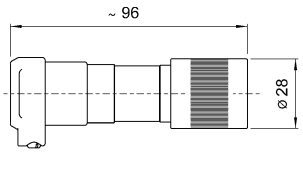
Voltage	No. of poles	Coding	Coupler / flange sokket	Plug / device plug	Recommended colour coding
Bus	4 P	2 h	 10905E00	 10906E00	green
Bus + shield	4 P + ⏚*	1 h	 10903E00	 10904E00	without
24 V AC	2 P + ⏚	12 h	 10237E00	 10259E00	without
110 V ... 130 V AC	2 P + ⏚	4 h	 10234E00	 10256E00	yellow
230 V ... 250 V AC	2 P + ⏚	6 h	 10235E00	 10257E00	red
	4 P + ⏚*	10 h	 10236E00	 10258E00	blue
24 V DC	4 P + ⏚*	5 h	 06452E00	 06474E00	green / red
	4 P	8 h	 10238E00	 10260E00	grey

* with PE bracket

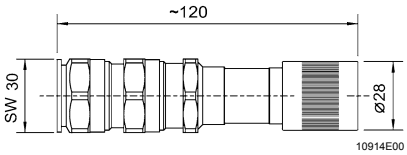
Dimensional drawings (all dimensions in mm) - subject to alterations



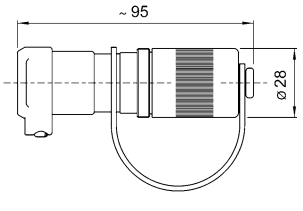
8591/.7.-..-0.0. Plug
(plastic)



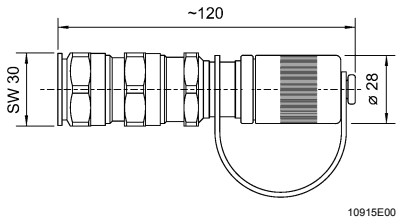
8591/.7.-..-..0. Plug
(metal)



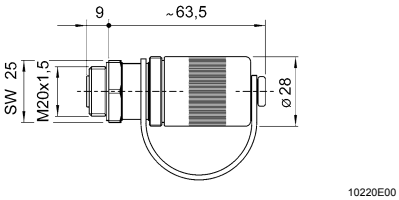
8591/.7.-..-..01 Plug for armoured cables
(metal)



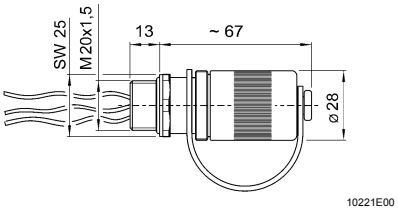
8591/.3.-..-..0. Coupler
(plastic, metal)



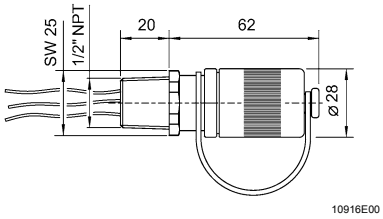
8591/.3.-..-..01 Coupler for armoured cables
(metal)



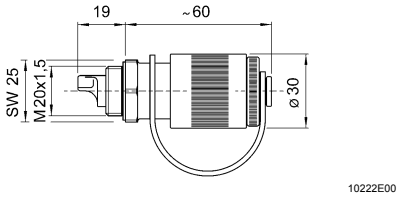
8591/.8.-..-0.01 Flange socket
(plastic)



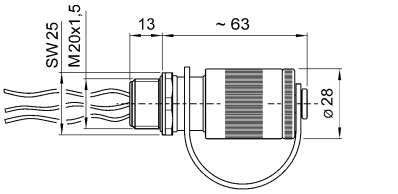
8591/.8.-..-..01 Flange sokket
(metal)



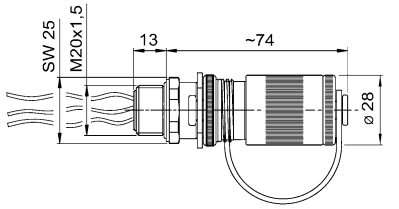
8591/.8.-..-..01 Flange sokket with $^1/_2$″ NPT thread
(metal)



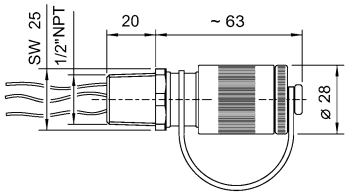
8591/.9.-..-0.01 Flange socket
(plastic)



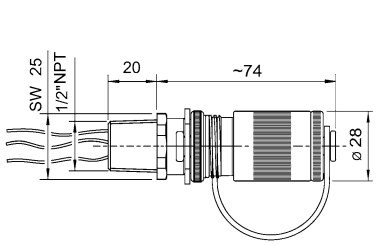
8591/.9.-..-..01 Device plug for Ex d enclosure with volume < 2 l
(metal)



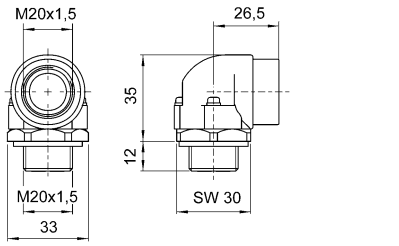
8591/.6.-..-..01 Device plug for Ex d enclosure with volume > 2 l
(metal)



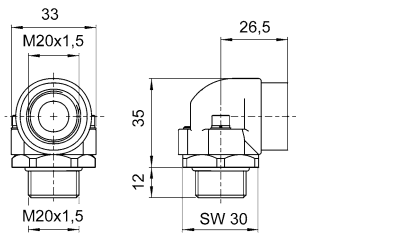
8591/.9.-..-..01 Device plug with $^1/_2$″ NPT thread; for Ex d enclosures with volumes < 2 l
(metal)



8591/.6.-..-..01 Device plug with $^1/_2$ ″ NPT thread; for Ex d enclosures with volumes > 2 l
(metal)



8591/11.-..-0.01 Angled adaptor
(plastic)



8591/11.-..-..01 Angled adaptor
(metal)

6 Transport, Storage and Disposal

Transport

▶ Shock-free in its original carton, do not drop, handle carefully.

Storage

▶ Store in a dry place in its original packaging
▶ Permitted temperature range for storage in original packaging: - 55 °C ... + 80 °C

Disposal

▶ Ensure environmentally friendly disposal of all components according to legal regulations.

7 Installation

⚠WARNING	
	**Danger from energised parts!** ▷ Risk of severe injuries. ▶ All connections and wiring must be disconnected from the power supply. ▶ Secure the connections against unauthorised activation.

⚠WARNING	
	**Incorrectly mounted components!** ▷ Explosion protection cannot be guaranteed any more if the components are incorrectly mounted. ▶ Carry out the assembly in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).

☞	R. STAHL supplies the mini CLIX plug connectors on request with prefabricated leads. Please contact your local sales representative for more information.

☞	Excessive tightening of the locking screw can negatively affect the strain relief / sealing.

☞	If possible, mount the device plugs and flange sockets with the plug opening oriented downward.

☞	To ensure correct functionality of the plug, non-used pins should also be fitted.

Before installation:

▶ Disconnect all connections and wiring from the power supply and secure them against unauthorised activation.
▶ Check if holes and screw-in threads are intact and clean.
▶ Make sure that threads and threaded holes match.
▶ Check that the seal ring is positioned correctly and intact.

Before fitting the flange socket, device plug and angled adaptors in flameproof enclosures:

- ▶ Disconnect all connections and wiring from the power supply and secure them against unauthorised activation.
- ▶ The threaded holes in the flameproof protective enclosure must meet the minimum requirements of IEC/EN 60079-1 o.
- ▶ Check that the flange socket, device plug and angled adaptors and the corresponding holes and screw-in threads are intact and clean.
- ▶ Make sure that threads and threaded holes match.
- ▶ Check that the seal ring is positioned correctly and intact.

7.1 Tested cable types

Presently tested cable types to be used with Ex-d plug connector acc. to IEC/EN 60079-0:

☞	IP68: submerged in 2 m water for one hour.

Torque applied to locking nut (pressure fitting): 5 Nm
Test weight = diameter x 20 N

- ✗ Ölflex classic 100
- ✗ Ölflex classic 400
- ✗ Ölflex classic 110
- ✗ H07 BQ-F 3G1.5
- ✗ H07 BQ-F 5G1.5
- ✗ JZ-500
- ✗ Y-JZ
- ✗ RD-Y(ST)Y blue
- ✗ JE-LiYCY
- ✗ NYM
- ✗ NYY
- ✗ Ölflex EB001250 R4G1.5
- ✗ H05VV-F 3 G1.0
- ✗ *Unitronic Bus L2/FIP FC
- ✗ *Unitronic Bus FD PL2/FIP FC UL/CSA

Torque applied to locking nut (pressure fitting): 5 Nm
Test weight = diameter x 20/4 N

- ✗ JE-Y(ST)Y
- ✗ H07-RN-F 3G1.0
- ✗ H07-RN-F 3G1.5
- ✗ H07-RN-F 3G2.5
- ✗ H07-RN-F 3G0.75
- ✗ H05-RR-F 3G
- ✗ H05-RR-F 3G1.5
- ✗ H05-RR-F 5G1.5
- ✗ Silflex SiHf
- ✗ Sinec LZ bus cable

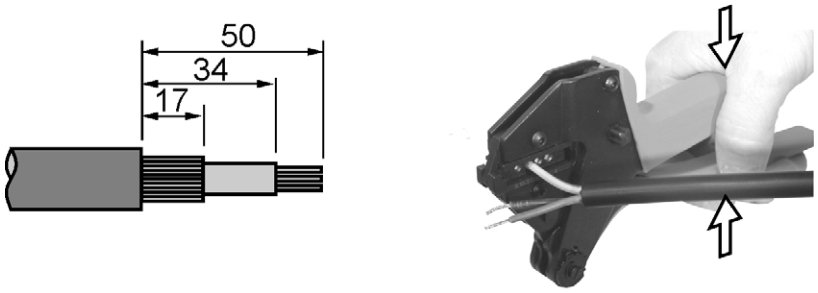
*with separate sealing insert

7.2 Crimp connection

⚠ WARNING
Damage to the crimped contacts! ▷ Using an unsuitable crimping tool can damage the crimped contacts. ▶ Use only the original R. STAHL crimping tool (see accessories).

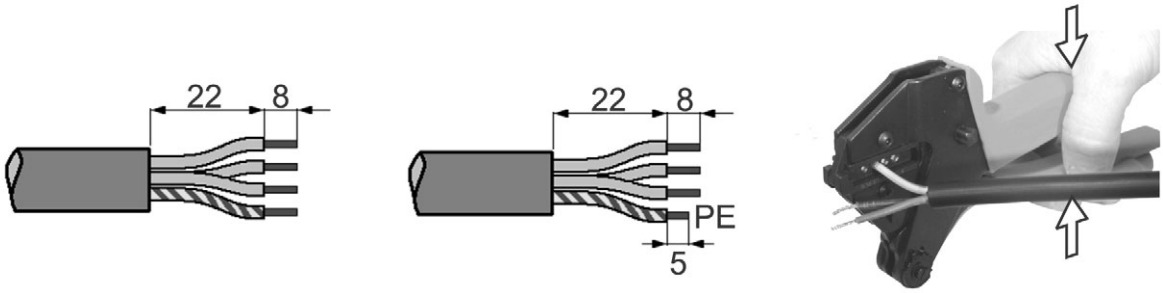
☞	The insulation of the connecting cables must reach to the plug pins and plug socket. The conductor itself may not be damaged.

Armoured cable:



11364E00

All other types:



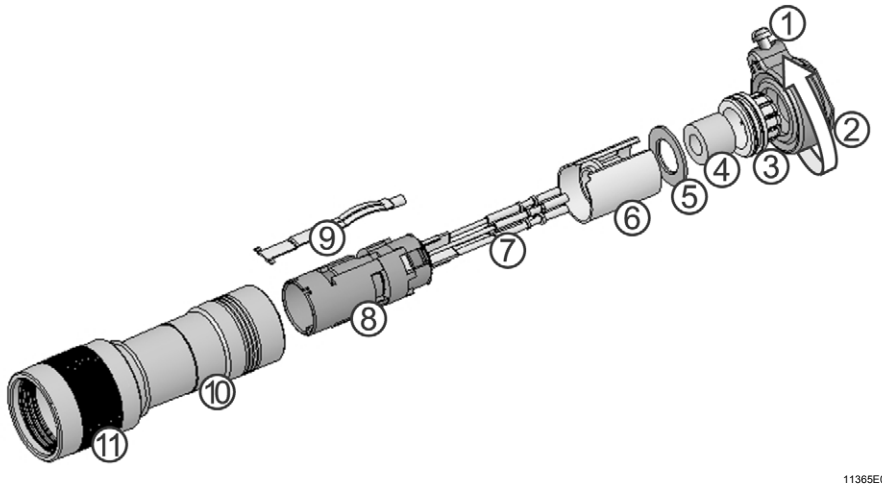
11363E00

(Fig.: left without PE bracket; right: with PE bracket)

▶ Strip the insulation as depicted in the drawing.
▶ Insert the stripped cables into the plug pins or plug sockets and crimp using the crimping tool as shown in the graphic.

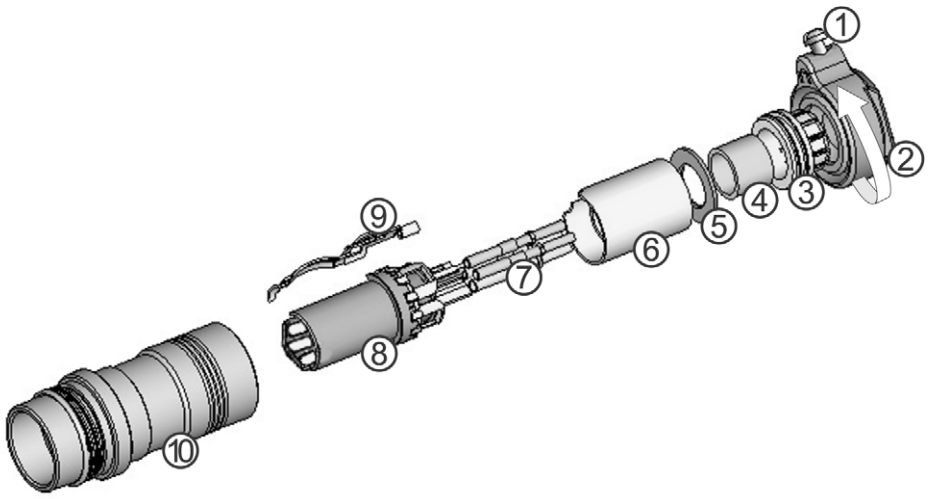
7.3 Plug/coupler (Ex-e) - plastic/metal 5-pole (4 + PE) with crimp connection

Fig.: Plug



11365E00

Fig.: Coupler



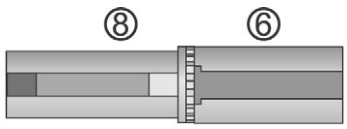
11366E00

☞	Before assembly, make sure that you have the correct plug/coupler version for the cable cross-section! Possible versions: ✗ Cable cross section 4mm ... 7.5 mm ✗ Cable cross section 7.5mm ... 11 mm

- ▶ Loosen the locking screw (1).
- ▶ Screw off the pressure fitting (2).
- ▶ Press the individual components 3 - 9 forward and out through the sleeve (10).
- ▶ Insert the stripped cable in the opening of the plug pins / plug sockets (7) or the PE bracket (9) and fasten it with the crimping tool.
- ▶ Optionally, the plug pins/sockets can also be soldered.Use shrink tubing to protect the soldering points.

11367E00

- Push the the pressure fitting (2) and the cable strain-relief (3) onto the connecting cable.
- Push the seal (4) onto the connecting cable and guide it into the cable strain-relief (3).
- Push the pressure washer (5) and insulating sleeve (6) onto the connecting cable.

☞	Make sure that the insulation sleeve (6) is correctly oriented.A subsequent correction is difficult.	

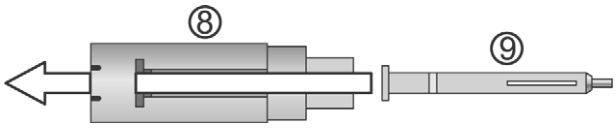
- Guide the plug pins (7) from behind into the device plug insert (8) until the stop. The hexagonal edges of the plug pins must be correctly aligned so as to fit in the plug insert (8). Insert the thick plug pin first (hole No. 4).

☞	After having inserted the plug pins into the plug insert, they cannot be disassembled again.

- Push the insulating sleeve (6) onto the plug insert (8).

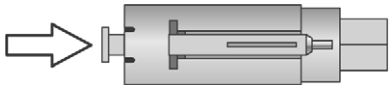
Assembling a plug:

- Guide the PE bracket (9) into the recess in the plug insert (8).



11369E00

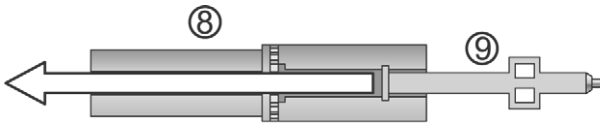
- Push the PE bracket (9) backwards into the groove on the front side of the plug insert (8) until it engages.



11370E00

Assembling a coupler:

- Guide the PE bracket (9) into the recess in the plug insert (8).



11371E00

- Push the PE bracket (9) backwards into the groove on the front side of the plug insert (8) until it engages.

11372E00

- ▶ Push the pressure washer (5), the seal (4), the strain-relief (3) and pressure fitting (2) onto the insulating sleeve (6).
- ▶ Guide the plug insert (8) correctly in the plug enclosure (10). Groove and nose must match.
- ▶ Approach the union nut from the opposite side.
- ▶ Screw the pressure fitting (2) onto the plug sleeve and secure with the locking screw (1).

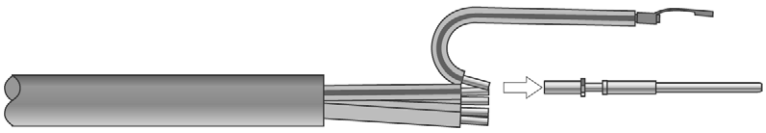
11373E00

⚠ WARNING
Threads can be damaged by screwing on at an angle! ▶ Exercise care (straight alignment) when inserting and screwing on all components.

7.4 Plug/coupler (Ex-e) - plastic/metal 4-pole (3 + PE) with crimp connection

☞	Assembly of the 4-pole plug/coupler proceeds in the same manner as the 5-pole version described. The PE bracket (9) is not used. The PE pin (AC coding: the pin is thick and leading; DC coding: the pin is thick) is additionally coded with the clock-based coding system as are the other plug connectors.

☞	With metal versions, the PE bracket must be crimped together with the leading PE pin.



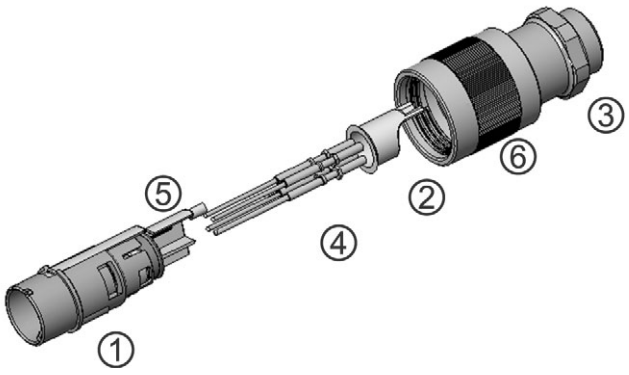
11375E00

7.5 Device plug / flange socket (Ex-e) - plastic 5-pole (4 + PE) with crimp connection

⚠WARNING
Limited area of application! ▶ The device plug is only to be used in enclosures designed for type of protection Ex-e.

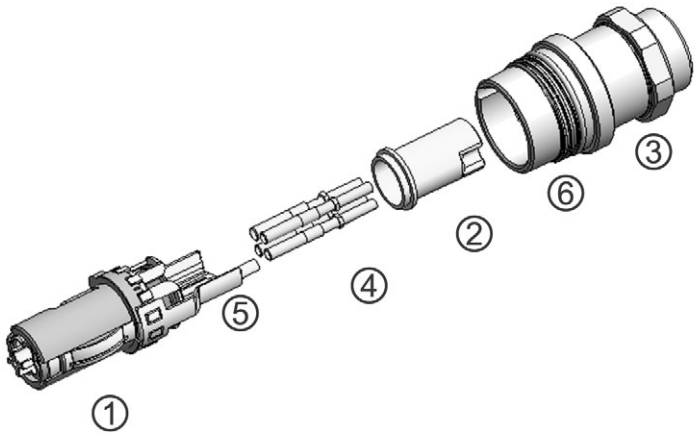
☞	After having inserted the plug pins into the plug insert, they cannot be disassembled again.

Fig.: Device plug



11376E00

Fig.: Flange socket



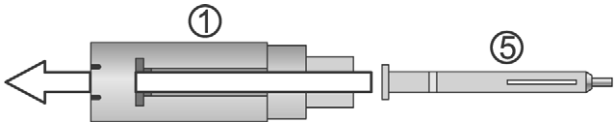
11377E00

- ▶ Pull the device plug insert (1) together with the insulating sleeve (2) out of the plug sleeve (3).
- ▶ Insert the stripped cable in the opening of the plug pins (4) or the PE bracket (5) and fasten it with the crimping tool.
- ▶ Optionally, the pin connections can also be soldered. Use shrink tubing to protect the soldering points.
- ▶ Guide the plug pins (4) from behind into the device plug insert (1) until the stop. The hexagonal edges of the plug pins must be correctly aligned so as to fit in the plug insert (1).
- ▶ Push the insulating sleeve (2) with correct orientation over the connected cable and the plug insert (1).

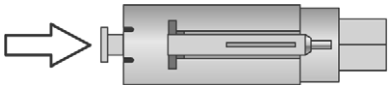
11373E00

Assembling a plug:

- Guide the PE bracket (5) into the recess in the plug insert (1).

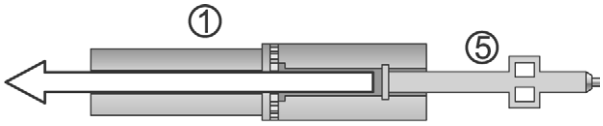


- Push the PE bracket (5) backwards into the groove on the front side of the plug insert (1) until it engages.



Assembling a coupler:

- Guide the PE bracket (5) into the recess in the plug insert (1).



- Push the PE bracket (5) backwards into the groove on the front side of the plug insert (1) until it engages.

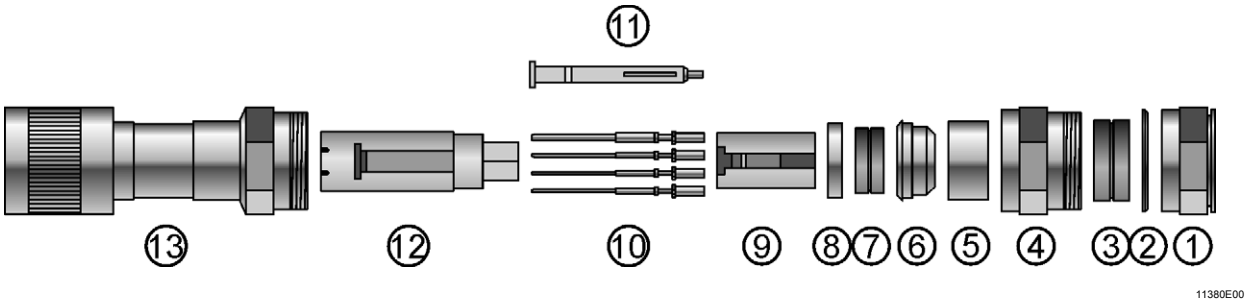
- Insert the entire device plug insert (1) with the connecting cable to the front through the device plug sleeve (3) until it audibly latches into position.

☞	After latching, disassembly is no longer possible.

7.6 Device plug / flange socket (Ex-e) - plastic 4-pole (3 + PE) with crimp connection

☞	Assembly of the 4-pole device plug proceeds in the same manner as the 5-pole version described. The PE bracket (5) is not used. Instead, there is a leading PE pin, which is coded with the clock-based coding system as are the other plug connectors.

7.7 Plug / coupler for armoured cable (Ex-e) - metal 4-pole and 4-pole + PE

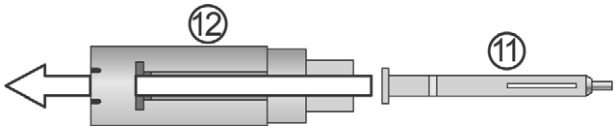


- Unscrew the gland (1) and remove it together with parts 2 - 8 from the plug/coupler sleeve (13).
- Remove the protective membranes from seals (3) and (7).
- Push the plug insert (12) and insulating sleeve (9) forward and out through the plug sleeve (13).
- Insert the stripped cable in the opening of the plug pins (10) or the PE bracket (11) and fasten it with the crimping tool.
- Optionally, the pin connections can also be soldered. Use shrink tubing to protect the soldering points.
- After crimping/soldering, push the screw-on parts 1-8 and insulating sleeve onto the connecting cable.

☞	After having inserted the plug pins into the plug insert, they cannot be disassembled again.

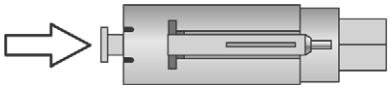
▶ Guide the plug pins (10) from behind into the device plug insert (12) until the stop. The hexagonal edges of the plug pins must be correctly aligned so as to fit in the plug insert (12).
▷ They audibly latch into position.

Version with PE bracket (11):



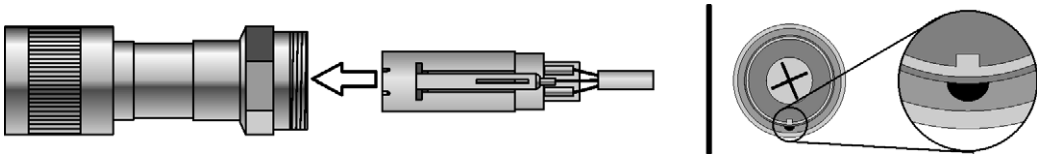
11381E00

▶ Guide the PE bracket (11) into the recess in the plug insert (12).



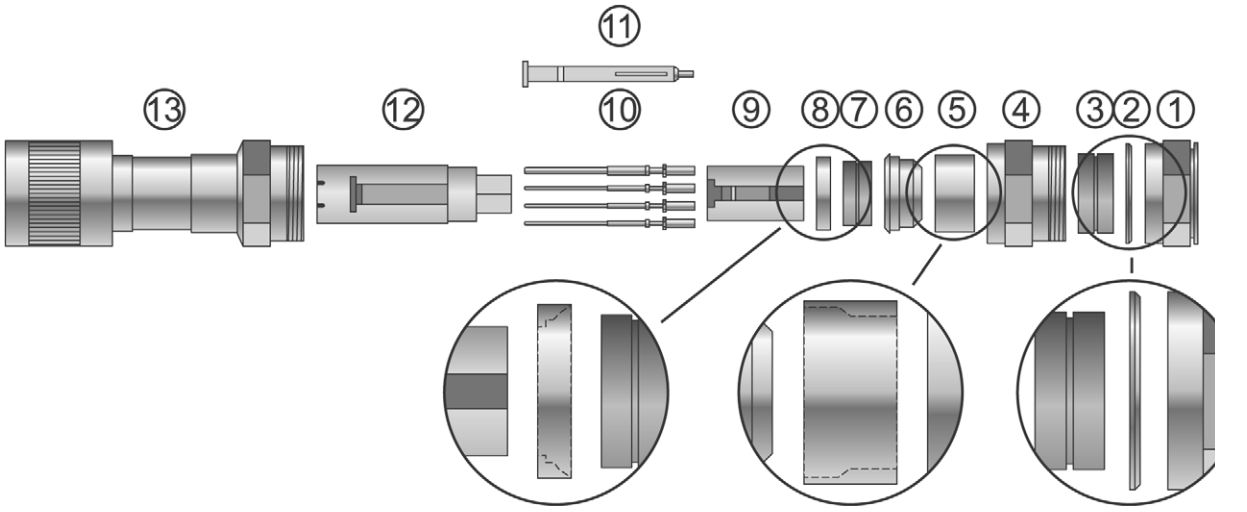
11370E00

▶ Push the PE bracket backwards into the groove on the front side of the plug insert until it engages.
▶ Insert the plug insert (12) together with the insulating sleeve (9) into the plug sleeve (13) in the correct position from behind.



11382E00

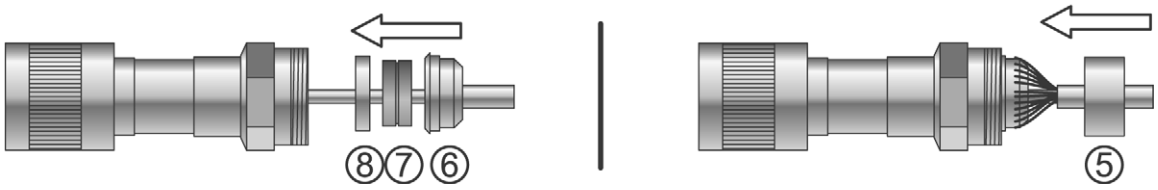
During the following assembly steps make sure that the components are correctly oriented:



11383E00

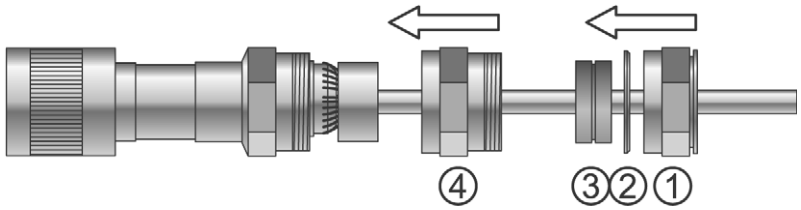
▶ Insert the pressure washer (8), the seal (7) and clamping cone (6) in the plug sleeve (13).
▶ Place screen wire shielding over the clamping cone (6).

▶ Push the sleeve (5) over the screen wire shielding.



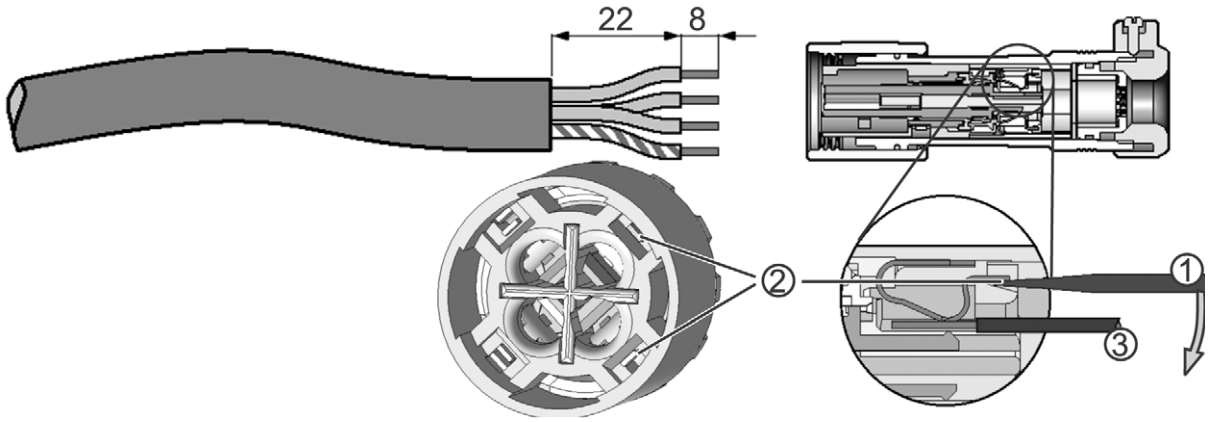
11384E00

▶ Screw the inner gland nut (4) onto the plug sleeve.
▷ The sleeve clamps the screen wire shielding onto the clamping cone.
▷ The seal clamps the inner sheath of the connecting cable.
▶ Place the thrust ring (3) and seal (2) against the gland nut (1).
▶ Make sure that the seal sits correctly.
▶ Screw the gland nut (1) onto the inner gland nut (4) using the corresponding tightening torque (see technical data).



11385E00

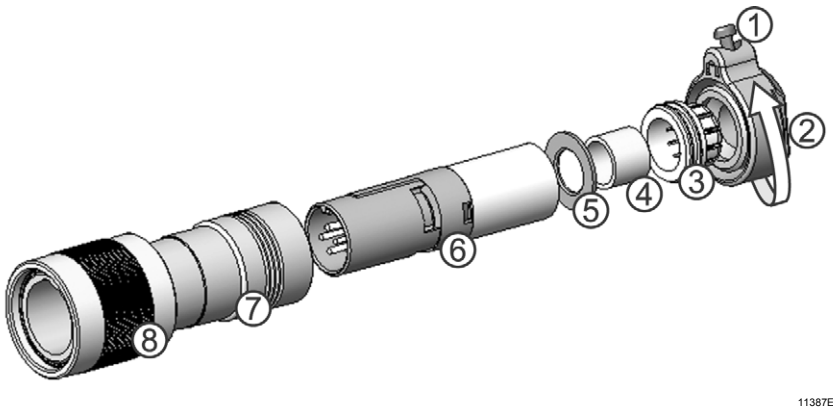
7.8 Plug/coupler (Ex-e) - plastic/metal 4-pole (3 + PE) with cage clamp terminal



11386E00

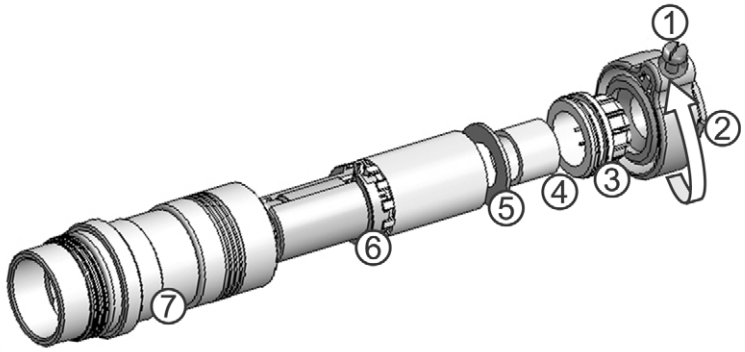
▶ Strip the insulation as depicted in the drawing.
▶ Open the cage clamp terminal (2) using an appropriate tool (1) (e.g. screwdriver 2.5 x 75).
▶ Insert the connecting cable (3).
▶ Pull the tool out.
▷ In so doing, the cage clamp spring is pressed against the connecting cable.
▷ Electrical contact between connecting cable and plug pin is established.
▶ Proceed in reverse order to undo the connection.

Fig.: Plug



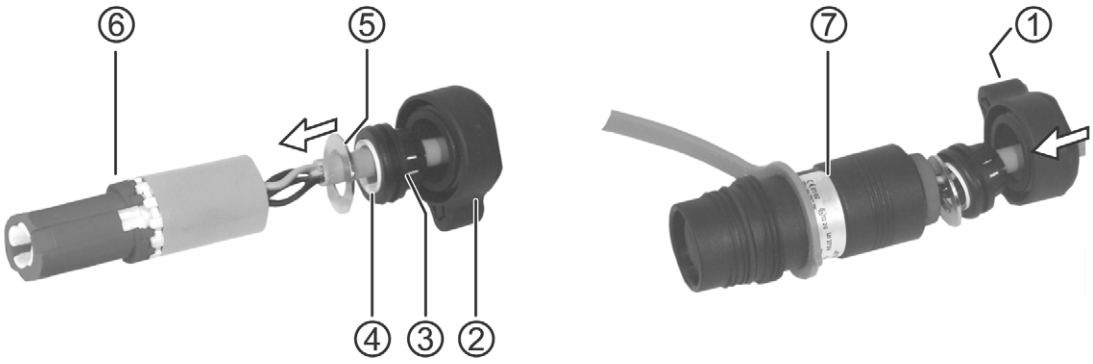
11387E00

Fig.: Coupler



11388E00

- ▶ Loosen the locking screw (1).
- ▶ Screw the pressure fitting (2) out of the plug/coupler sleeve (7).
- ▶ Screw out the individual parts 3-6.
- ▶ Guide the stripped wire through the pressure fitting, the strain-relief (3), the seal ring (4) and the pressure washer/shield (5).
- ▶ Connect the connecting cable as described above.



11389E00

- ▶ Align and insert the plug insert (6) correctly into the plug/coupler sleeve (7).
- ▶ Insert the pressure washer/shield (5), the seal ring (4) and the strain-relief (3) in the plug sleeve (7).

⚠WARNING
Threads can be damaged by screwing on at an angle! ▶ Exercise care (straight alignment) when inserting and screwing on all components.

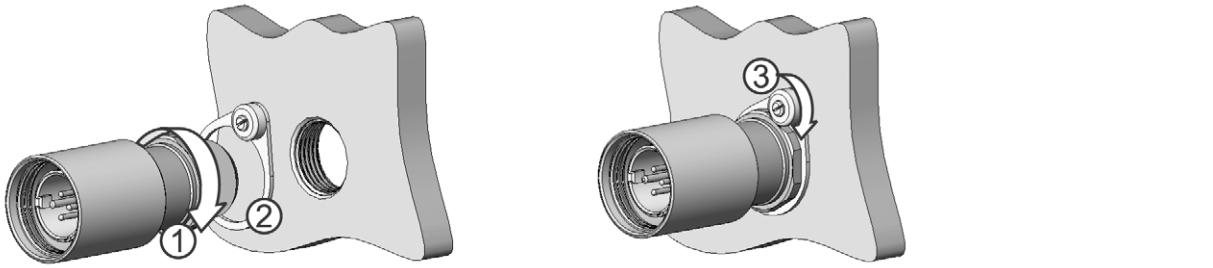
- ▶ Screw on the pressure fitting and then secure it in place using the locking screw (1).

7.9 Direct connection of metal device plug / flange socket using individual wires

⚠WARNING
Prevent twisting of the components! ▶ Secure components against twisting or loosening by taking appropriate measures (e.g. anti-twist device, see accessories and spare parts).

⚠WARNING
Danger due to damaged cables! ▷ Careless screwing can damage the cables and their insulation. ▶ Exercise care when screwing components together.

☞	To ensure explosion protection, insert only device plugs and flange sockets made of metal in the holes of the flameproof enclosures.



11390E00

▶ Screw the flange socket (1) or device plug (1) together with the anti-twist device (2) in the enclosure (threaded hole: M20; wrench size: SW25).
▶ Secure the device plug or flange socket against unintentional turning by screwing in the locking screw (3).

☞	Test torques: see data sheet or chapter “Technical data“ in these operating instructions.

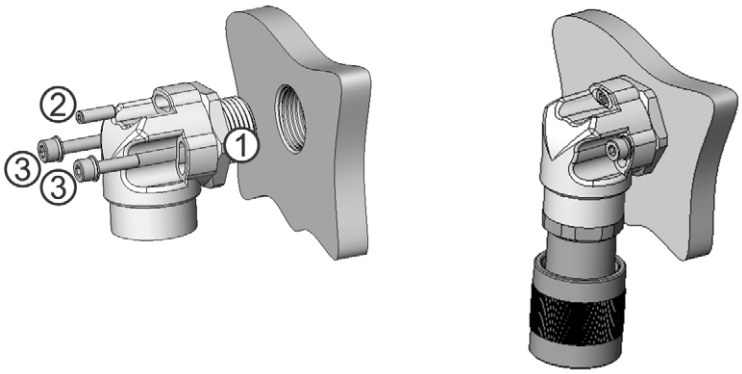
7.10 Locking mechanism

11392E00

The plug connector may be delivered with an optional locking mechanism. It can then be safeguarded by means of a padlock when plugged in (hasp diameter 3 ... 6 mm).

☞	The union nut has to be unscrewn before undoing the connection.
☞	The locking mechanism cannot be retrofitted.

7.11 Rotating the angled adaptor



11392E00

The position of an already screwed-in angled adaptor can be changed without having to screw out the threaded support base (1).

- ▶ Unscrew the anti-twist device (2).
- ▶ Remove the screws (3).
- ▶ Rotate the angled adaptor to the desired position.
- ▶ Screw the screws (3) in the matching visible holes.
- ▶ Fasten the anti-twist device (2) again.

8 Commissioning

8.1 Before commissioning

- ▶ Subject the apparatus to the individual certification tests by the relevant national testing authority.
- ▶ Test the components for correct operation and installation in accordance with the operating instructions and other applicable specifications.
- ▶ Ensure that the same earth potential is present throughout the system.
- ▶ Check that cables and lines are clamped properly.
- ▶ Inspect enclosure for damage.
- ▶ Inspect enclosure for foreign bodies.
- ▶ Observe the nominal voltage.

8.2 Connecting / disconnecting the plug connector

⚠WARNING
Incorrectly connected plug and socket! ▷ Explosion protection cannot be guaranteed any more if the plug and socket are incorrectly connected. ▶ Proceed in strict accordance with the operating instructions.

⚠WARNING
Risk of damage to plug or socket! ▶ Components to be connected must have the same coding.

⚠WARNING
Danger from energised parts! ▶ Ensure that the plug/device plug is voltage free when the plug connection is disconnected.

⚠WARNING
Danger from energised parts! ▶ Energised couplers/flange sockets must be closed off by means of protective caps immediately after disconnection.

- ▶ Check for damage before the plug / device plug is plugged into the socket.

11393E00

- ▶ Insert the plug/device plug with the guide nose in the correct position in the corresponding guide groove (1).
- ▶ Push the components together until the first end-stop (2).

11394E00

- ▶ Rotate the connector plug/coupler by about 30° to the right until you reach the second stop (3).
- ▶ Fully insert the plug into the socket (4).
- ▶ Fasten the union nut (5).
- ▷ The mechanical connection as well as the IP protection are now established.
- ▶ Proceed in reverse order to disconnect the plug connector.

9 Maintenance

⚠ WARNING
Danger from energised parts! ▷ Explosion protection is not guaranteed any longer. ▶ Ensure that the plug/device plug is voltage free when the plug connection is disconnected. ▶ Energised couplers/flange sockets must be closed off by means of protective caps immediately after disconnection.

⚠ WARNING
Short-circuit in the circuit ▷ After multiple short circuits, the flameproof encapsulation is no longer guaranteed. ▶ After a short circuit, check the functionality of the plug connector. ▶ Replace the entire plug connector if needed.

⚠ WARNING
Work on gap limiting surfaces! ▶ Gap limiting surfaces are neither to be reworked nor lacquered after purchase of the device.

9.1 Regular Maintenance Work

- ▶ Consult the relevant national regulations (e.g. IEC/EN 60079-17) to determine the type and extent of inspections.
- ▶ Plan the intervals so that any defects in the equipment which may be anticipated are promptly detected.

To check as part of the maintenance schedule:

- ✗ Check that cables and lines are clamped properly.
- ✗ Inspect device for visible damage.
- ✗ Compliance with the permitted temperatures in accordance with IEC/EN 60079-0.
- ✗ Make sure the device is used according to its designated use.

9.2 Repair work

- ▶ Repairs that may affect the explosion protection are only to be performed by the manufacturer.
- ▶ No changes to the apparatus are permitted.
- ▶ Maintenance work and repairs may only be performed using original replacement parts supplied by the manufacturer.

In case of damage to the plug pins:

- ▶ Replace the apparatus. Disassembly cannot be performed, therefore repair is not possible.

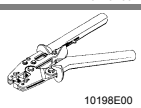
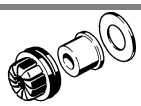
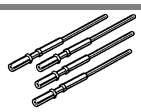
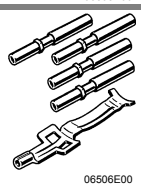
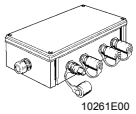
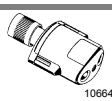
In case of damage to the flameproof enclosure:

- ▶ The device must be returned to the manufacturer for repair.

9.3 Cleaning

- ✗ Clean with a cloth, brush, vacuum cleaner or similar items.
- ✗ When cleaning with a damp cloth, use water or mild, non-abrasive, non-scratching cleaning agents.
- ✗ Never use aggressive cleaning agents or solvents.

10 Accessories and Spare Parts

Designation	Illustration	Description	Order number
Angled adaptor	 10212E00	Plastic (polyamide)	154472
Angled adaptor	 10213E00	Nickel-plated brass	154476
Protective cap for coupler, flange socket	 10211E00	Plastic (polyamide)	109348
		Nickel-plated brass	109346
Protective cap for plug, device plug	 10210E00	Plastic (polyamide)	109349
		Nickel-plated brass	109347
Crimping tool	 10198E00	up to 4 mm^2, for all versions with crimp connectors	109116
Anti-twist device	 10891E00	for flange socket and device plug	154570
Strain relief	 10892E00	with gasket and plate ∅ 4 mm ... 7.5 mm	154574
		with gasket and plate ∅ 7.5 mm ... 11 mm	154578
Plug pins	 06507E00	4 x 1.5 mm^2 for plug	109352
		4 x 2.5 mm^2 for plug	109353
		4 x 1.5 mm^2 for plug (incl. PE connection, PE leading)	109354
		4 x 2.5 mm^2 for plug (incl. PE connection, PE leading)	109355
Plug pins + PE bracket	 06508E00	4 x 1.5 mm^2 + PE bracket for plug	109364
		4 x 2.5 mm^2 + PE bracket for plug	109365
Plug sockets	 06505E00	4 x 1.5 mm^2 for coupler or flange socket	109356
		4 x 2.5 mm^2 for coupler or flange socket	109357
Plug sockets + PE bracket	 06506E00	4 x 1.5 mm^2 + PE bracket for coupler or flange socket	109366
		4 x 2.5 mm^2 + PE bracket for coupler or flange socket	109367
Distribution box	 10261E00	with 1, 2, 4 or 6 branches (flange socket: plastic or metal) in plastic or metal	
Y adapter with cable entry	 10664E00	for looping of data, signal or power cables; also for fieldbus cables	
Y adapter with connectors	 10912E00	for looping of data, signal or power cables; all connections can be plugged	

11 CE prototype test certificate (current supplement)

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 03 ATEX 1097 X

Gerät: Steckverbinder Typ 8591/...-..-....

Kennzeichnung: Ex **II 2 G EEx de IIC T6 II 2 D IP 66 T 52 °C**

Hersteller: R. Stahl Schaltgeräte GmbH

Anschrift: Am Bahnhof 30
74638 Waldenburg (Württ.), Deutschland

Beschreibung der Ergänzungen und Änderungen

Der Steckverbinder Typ 8591/...-..-.... darf mit folgenden Änderungen gefertigt werden:

- Zur besseren Handhabung wird der Steckverbinder mit einer geometrischen Änderung gefertigt.
- Der Steckverbinder wird auch für eigensichere Stromkreise verwendet. Das Explosionsschutzkennzeichen hierfür lautet: **EEx ia/ib IIC T6**
- Die elektrischen Daten werden erweitert:

Bemessungsbetriebsspannung	bis	60 V	
Bemessungsstrom I_e	max.	2,5 A	0,5 A
Gebrauchskategorie		L/R 10 ms	DC-3

Bemessungsstrom I_e für Anschlusstechnik

Crimp- und Käfigfederzuganschluss	max.	10 A
QUICKON-Anschluss	max.	6 A

Andere als die vorstehend genannten Bemessungswerte sind bei Einhaltung des Einschalt- und Ausschaltvermögens entsprechend den einschlägigen Bestimmungen zulässig und sind vom Hersteller abhängig von Betriebsart, Gebrauchskategorie usw. festgelegt.

Angewandte Normen

EN 50014:1997 + A1 + A2 EN 50018: 2000 + A1 EN 50019:2000
EN 50020:2002 EN 50281-1-1:1998

Seite 1/2

EG-Konformitätserklärung
EC-Declaration of Conformity
Déclaration de Conformité CE

Wir; *we; nous*

R. STAHL Schaltgeräte GmbH, Am Bahnhof 30, 74638 Waldenburg, Germany

8591

erklären in alleiniger Verantwortung, dass das Produkt
hereby declare in our sole responsibility, that the product
déclarons, sous notre seule responsabilité, que le produit

Steckverbindung
Plug-in connector
Fiche et prise

mit der / *under* / *avec* **EG-Baumusterprüfbescheinigung:**
EC-Type Examination Certificate:
Attestation d'examen CE de type:

PTB 03 ATEX 1097 X
(Physikalisch-Technische Bundesanstalt
Bundesallee 100, 38116 Braunschweig)

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt
which is the subject of this declaration, is in conformity with the following standards or normative documents
auquel cette déclaration se rapporte, est conforme aux normes ou aux documents normatifs suivants

Bestimmungen der Richtlinie *Terms of the directive* *Prescription de la directive*	**Nummer sowie Ausgabedatum der Norm** *Number and date of issue of the standard* *Numéro ainsi que date d'émission de la norme*
94/9/EG: ATEX-Richtlinie *94/9/EC: ATEX Directive* *94/9/CE: Directive ATEX*	EN 60079-0: 2006 EN 60079-1: 2007 EN 60079-7: 2007 EN 60079-11: 2007 EN 61241-0: 2006 EN 61241-1: 2004
2004/108/EG: EMV-Richtlinie *2004/108/EC: EMC Directive* *2004/108/CE: Directive CEM*	EN 60947-1: 2007
Allgemeine Normen ohne Bezug auf eine Richtlinie *General standards without reference to a directive* *Normes générales sans référence à une directive*	EN 60529: 1991 + A1: 2000 EN 61984: 2001 EN 60999-1: 2000

Waldenburg, 21. Dez. 2010

Ort und Datum
Place and date
Lieu et date

i.V.

J.-P. Rückgauer
Leiter Entwicklung und Technik
Director Design and Technology
Directeur Développement et Technique

i.V.

Dr. S. Jung
Leiter Qualitätsmanagement
Director Quality Management Dept.
Directeur Dép. Assurance de Qualité